



CLIMATE
ACTION
RESERVE

Carbon Offsetting and How Cities Can Engage

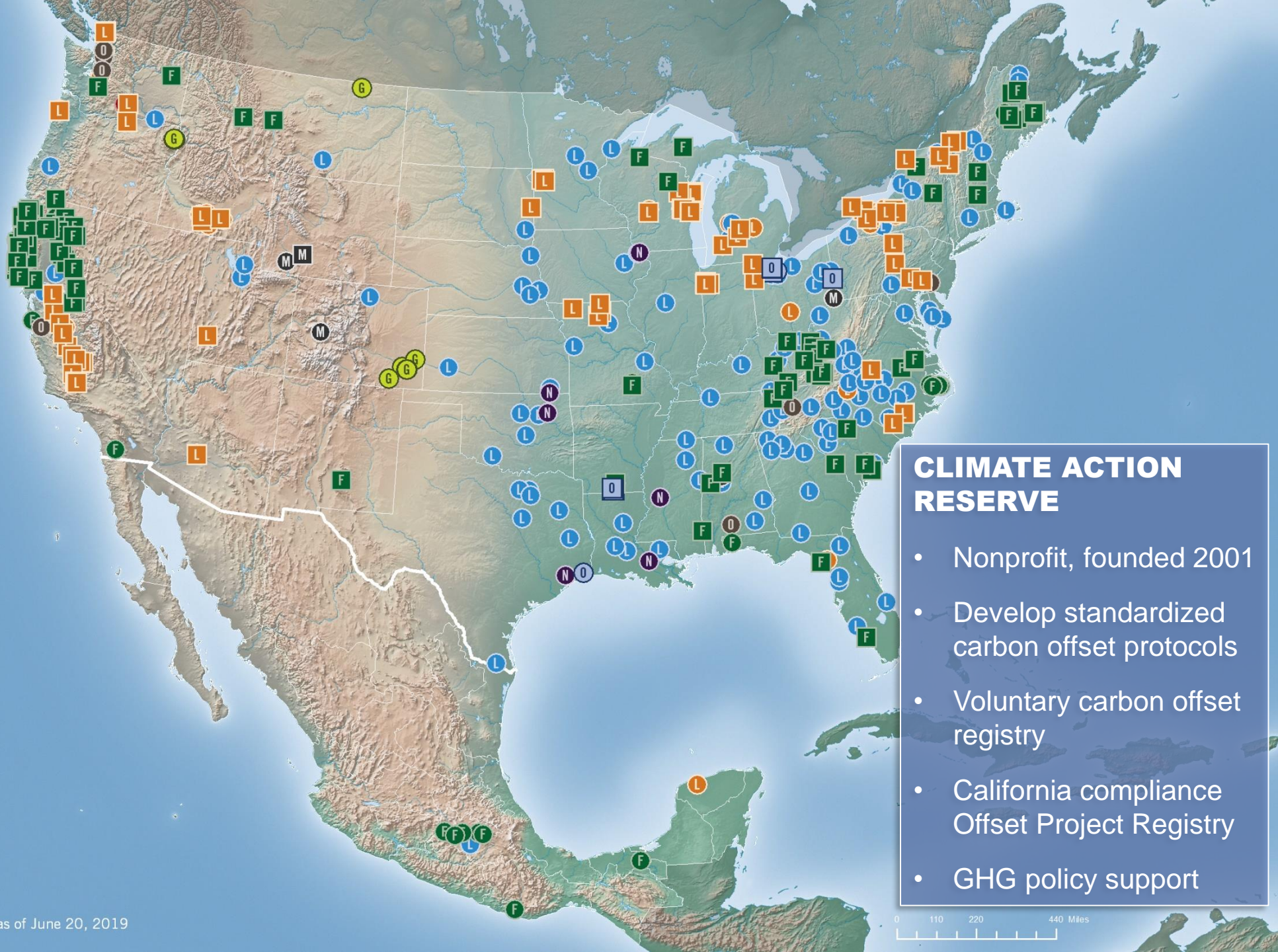
Cindy Chiang, Business Development Manager
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- F Forest (ARB)
- L Livestock (ARB)
- M Mine Methane (ARB)
- O Ozone Depleting Substances (ARB)
- O Composting
- F Forest
- G Grassland
- L Landfill
- L Livestock
- M Mine Methane
- N Nitric Acid Plants
- N Nitrogen Management
- O Organic Waste Digestion
- O Ozone Depleting Substances

Listed, Registered, Transitioned, & Completed Projects as of June 20, 2019



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- Nonprofit, founded 2001
- Develop standardized carbon offset protocols
- Voluntary carbon offset registry
- California compliance Offset Project Registry
- GHG policy support

Carbon offset = 1 metric ton of CO₂e reduced



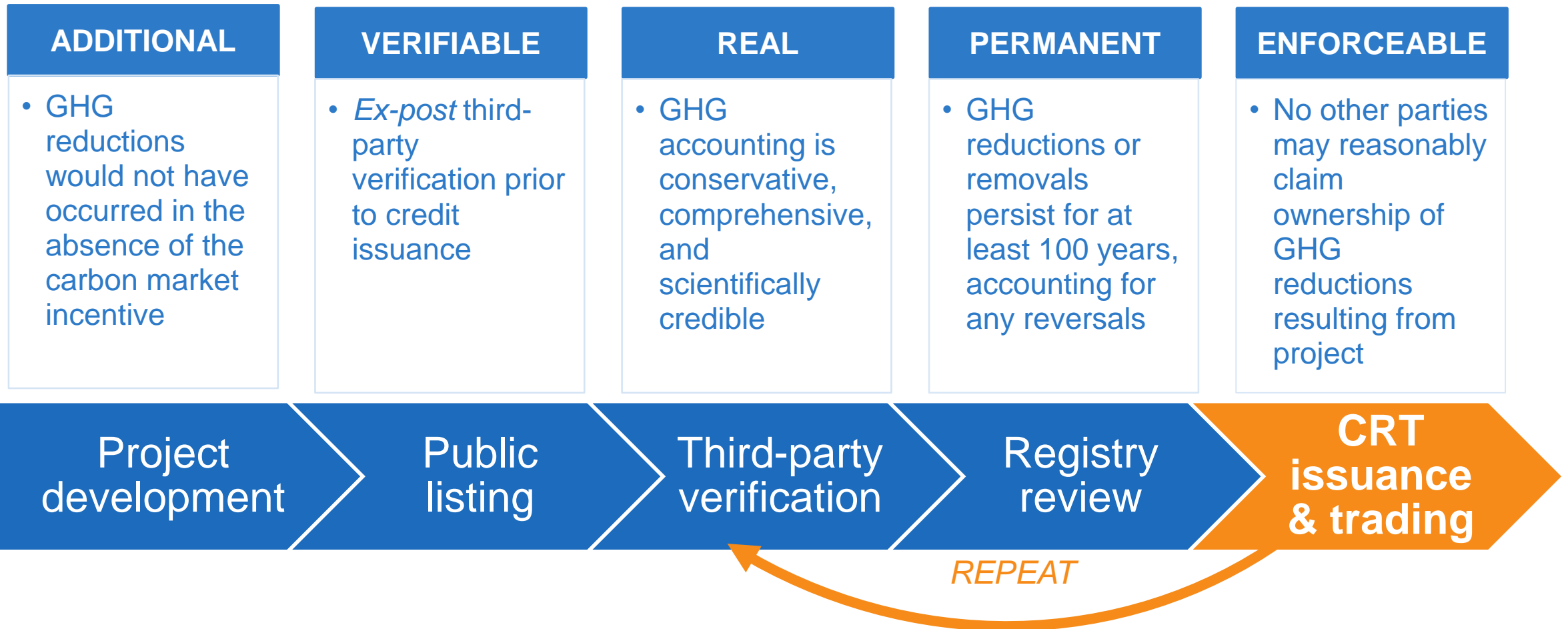
- Verified emissions reductions in unregulated sectors with barriers to adoption
- Sellers need incentives to reduce GHGs
- Buyers want/need to offset their own emissions
- 1 offset credit = 1 mtCO₂e
 - 1 CRT = 1 Climate Reserve Tonne (CRT)



How are offsets generated?

The Reserve develops standardized offset protocols

- Engage with government, industry, academia, and technical stakeholders, plus public comment



Project types

18 protocols applicable for emissions reduction activities in the U.S., Mexico, and Article 5 Countries

LAND USE

- Forest *
- Urban forest
- Grassland

AGRICULTURE

- Livestock manure *
- Fertilizer management
- Rice cultivation

INDUSTRIAL GASES

- Mine methane
- Boiler efficiency ^
- Ozone depleting substances +
- Nitric acid production

ORGANIC WASTE

- Landfill gas *
- Composting
- Anaerobic digestion

* US & MX ^ MX only + US, MX, and Article 5 countries

Example: landfill gas











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- Organic waste breaks down in landfills and generates methane (CH_4)
- Very large landfills are regulated by the EPA
- Unregulated landfills face little incentive to control CH_4 emissions
 - Smaller landfills don't benefit as much from renewable power incentives
- Must install a gas collection and control system (GCCS), with metering for gas flow and methane content
- Project data are verified annually prior to credit issuance
- Projects are eligible for 10 years, renewable once
- **117 projects in listed, registered, completed**
- **30,3592,643 credits issued**

Carbon market types

| | Voluntary Market | Compliance Market (California example) |
|---------------|--|---|
| End Buyer | Any individual, business, nonprofit, city or utility voluntarily reducing emissions | Large emitters and utilities required to reduce emissions by law |
| Standard | Climate Action Reserve protocols, other carbon registries | CA Air Resources Board approved protocols |
| Project Types | 18 project types | 6 project types, only Forest, MMC, ODS, Livestock used to date |
| Credit Prices | 50¢ - \$50*, depending on project type, location, buyer needs, co-benefits, etc. | \$10-\$12, tracking close to allowance prices |
| Costs | Generally lower than compliance Variable; includes: project feasibility study, installation, on-going monitoring & reporting, verification, business development for credit sales | Variable by project type; includes: project feasibility study, installation, on-going monitoring & reporting, verification, business development for credit sales |
| Risks | <ul style="list-style-type: none"> Finding buyers Price uncertainty overtime | <ul style="list-style-type: none"> Policy uncertainty re: Cap and Trade Program implementation ROC to ARBOCs conversion process Invalidation |
| End Users |     |     |

*Ecosystem Marketplace 2017 State of the Voluntary Market report

City case studies

| | Retail purchase: One-time credit purchase | Investment: Short/medium-term credit purchase contract | Project development: City-owned project |
|-------------------------|---|--|--|
| Example cities | Austin, Texas | Palo Alto, California | Arcata, California |
| Costs | Staff time | Staff time | Start up cost, ongoing MRV, Staff time |
| Credit Prices | \$3-\$10/CRT | \$8/CRT | \$4-\$10/CRT |
| Staff/department | Climate Program Manager, Sustainability Department | Senior Resource Planner, City of Palo Alto Utilities | Director of Environmental Services, Environmental Services |
| Project types | Landfill, Nitric Acid Production, Grassland, Forest | Forest (Mexico) | Forest |
| Challenges | Increase volume need overtime | Initial contact | Ongoing credit sales/need to find new credit buyers |
| Benefits | <ul style="list-style-type: none"> • Incremental progress toward carbon neutrality • Cost effective • Less staff time than onsite activities | <ul style="list-style-type: none"> • Carbon neutral natural gas portfolio • Community engagement | <ul style="list-style-type: none"> • \$4-\$10/CRT revenues • Community engagement • Community forest stewardship • CEQA compliance |

Resources for cities



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Templates

**Purchase
screening guide**

**Procurement
contract**

**Example staff
report**

Market & Projects Info

**Reserve Offsets
Marketplace**

**Reserve project
registry &
projects map**

**Ecosystem
Marketplace
reports**

Events

**North American
Carbon World**

**Reserve
Webinars**

**Events
newsletter**

Thanks! Questions?



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